

REMARKS

The claims have been amended as needed so as to sharpen the definition of the invention relative to the cited references, and new claims have been added drawn to further features of novelty of the present invention.

Reconsideration is accordingly respectfully requested, for the rejection of the claims as anticipated by or unpatentable over WOMACK et al., alone or in view of KAUSEK et al.

WOMACK discloses a brace support for a human knee joint. This is anatomically a fundamentally different type of joint to a horse's fetlock joint because of, inter alia, the presence of the patella or kneecap, absent in the horse, resisting forward or over-extension of the joint. The human knee joint is also capable of much more lateral or twisting movement.

The claims of the present invention are now limited to a tendon and ligament support device for a horse's fetlock joint.

WOMACK in any case describes a polycentric pivot arrangement; in the illustrated embodiments, there are two pivot axes 21 and 23, to provide counter-rotational movement between two mating gear wheels 19.

There is no disclosure or suggestion in WOMACK of any "resistance-exerting pivot arrangement" as claimed in the present invention, which "exerts a resistance to joint movement over a predetermined range of pivot rotation". The gear wheels 19 of Womack are free to move relative to one another without

encountering any resistance or any counter force, other than minimal friction, within their permitted range of movement (angular paths 25,27). In contrast, the pivot arrangement of claim 13 includes an element missing from WOMACK, which is some means to provide resistance to pivoting movement over (the whole) range of permitted movement. For instance, the Applicant describes embodiments which include "compression hinge 11", "compression hinge/carbon fibre joint 114", which in practice provides a degree of stiffness or physical resistance to pivoting that must be absent in WOMACK.

The permitted range of pivot movement in WOMACK is limited by stop members 29, 29'. These "resist" any further pivoting movement once the pivots have reached the end of their permitted range of movement only in the sense of braking or stopping further movement, but have not been adapted to exert any "resistance" or counter force across the rest of the range of pivot movement.

However, the main difference between the support device of the present invention, and all of the prior art cited resides in the "essentially inelastic connector of high tensile strength" which provides an effective pivot limiting function, but in addition progressively presses against the posterior side of the horse's fetlock joint, effectively cupping the sesamoid bones and providing direct support to the joint, spreading the load applied, as the two collars pivot apart. The applicant has

described this in embodiments of the invention as a "connecting piece 4", "artificial tensile tendon 12, 61, 71", made of any suitable inelastic and high tensile material such as Kevlar.

The advantages of the claimed arrangement are stated in the specification:

1. "any weight that might be transmitted to the sesamoid bones is transmitted over a wider area for reduced pressure on the sesamoid bones."
2. "The artificial tendon 61 effectively cups the back of the joint as it extends, as shown in Fig. 11", and
3. "prevents any tendency for upward slide of the collar 2."
4. "It can be seen from Fig. 12 how the connector piece 72 protects and bears the pressure that would normally be transmitted to the sesamoid bones."

Thus the claimed inelastic connector anchored to points on the inside of the collars is to be distinguished in function from arrangements of straps attached to the outside of the collars in the prior art. In contrast, straps on the outside;

- do not tend to bear directly and with progressively more force upon the joint itself as the collars hinge apart, providing no direct joint supporting function, or
- have a tendency to pull the two collars together, causing the lower collar to slip upwards, or

- simply provide a binding function, to keep the collars attached to the leg, often with a crossover to assist in this function, or
- may be of elastic material, in which case there is no pivot limiting function whatsoever.

The rear straps 6 in WOMACK might be considered equivalent to the claimed "essentially inelastic connector of high tensile strength" but WOMACK's straps do not provide any pivot limiting function and are simply provided to secure the brace to the user's leg - see col. 2, lines 55-58:

"The components 5 and 7 are generally secured to the leg of the user by straps such as thigh strap 2 and calf strap 4 with one or more crossing straps 6."

The straps 14 of NEBELON provide a similar binding function, but are said also to be "support straps". However, the NEBELON straps provide no direct joint support being brought to bear on the user's leg, as the collars hinge apart, and do not effectively cup the posterior side of the joint as the collars pivot apart, as claimed in the present invention.

The strap 30 of KAUSEK are of equivalent function to the straps 6 of WOMACK, being described as a "check strap" apparently providing a limiting function to the pivoting movement of the collars, but not providing any form of direct joint support as the collars pivot apart, as in the present invention.

The elastic strap and rubber ring arrangement of BORENDT is roughly equivalent to the connector of the present invention, but in BORENDT there is no pivot or hinge connection between the two collars. Because the BORENDT strap is not an inelastic connector, and because there is no pivot connection, there is not the combination of the action of the hinge with the connector counteracting against the hinge, as in the present invention.

The straps 42, 44 and pad 40 in FARLEY act as a kind of splint to correct a horse knee joint misalignment, but are independent of, and not connected to, the pivot 10. Thus, there is not the combination of the action of the pivot with the connector counteracting against the pivot, as in the present invention.

The essential and patentable differences between the present invention and the prior art cited to date, are therefore:

- 1) The hinge arrangement of the invention provides a resistance to pivoting movement over the predetermined range of pivot rotation. This is to be distinguished from a stop or check strap which only limits or resists movement at the end of the range of pivot rotation,  
in combination with,
- 2) the functioning of the connector to the rear of the joint, which must be of essentially inelastic material, anchored

to points on the inside of each respective collar, to provide;

- (a) an effective limit to the movement of the pivot, in use,
- (b) a means to support and effectively cup the back of the fetlock joint as it extends, i.e. as the collars pivot apart.

The practical significance of these differences is readily apparent in the described embodiments of the invention, which are a tendon and ligament support for a horse's fetlock joint, and which actually allow the horse to gallop while wearing the support. This is on account of the inherent stiffness of the pivot arrangement in combination with the pivot limiting function and bracing and supporting function at the posterior side of the joint provided by the inelastic connector arrangement to the rear of the fetlock joint. This would be impossible with the WOMACK arrangement, which allows free movement of the pivot and then suddenly no further movement when the stop is encountered.

Pending claim 22 is very clearly patentable over WOMACK, and KAUSEK because nowhere do either of these references disclose or suggest that the described knee brace would be suitable for a horse's fetlock joint, or the problem of over reach strike protection in a four-legged animal. The knee brace disclosed by WOMACK and KAUSEK is designed for a human being's knee joint, which is anatomically a fundamentally different type

of joint to a horse's fetlock joint, not to mention the very different loads to which the tendons and ligaments are subjected during joint movement. Nor do BORENDT and FARLEY teach any such arrangement providing over reach protection for a horse.

Pending claims 23-25 should all be patentable over WOMACK, because WOMACK does not disclose or teach the "resistance-exerting pivot arrangement" in combination with "an essentially inelastic connector of high tensile strength" of pending claim 21 on which each of claims 23-25 depend. Moreover, the passages cited by the examiner in WOMACK (col. 3, lines 25-67, and col. 4, lines 1-37) do not in fact describe any "constant resistance to joint movement as the pivot arrangement rotates" (claim 23), nor the facility to convert the "resistance-exerting pivot arrangement" of claim 21 to a nil resistance exerting pivot (claim 24), nor any pivot arrangement which is capable of being totally locked in position (claim 25).

New claim 26 would not be obvious in view of WOMACK, because WOMACK does not disclose, teach or suggest a resistance-exerting pivot arrangement which exerts progressively increasing resistance to joint movement as the pivot arrangement rotates under downward pressure, as well as "an essentially inelastic connector of high tensile strength". The same argument applies to new claim 28.

In new claim 27, the "adjustment means" has to be adapted to adjust the positioning of the "inelastic connector" to

the rear, because it is this which effectively limits the pivot range of movement. This would not be obvious in view of WOMACK, because WOMACK only teaches securing straps 6, and does not suggest the use of an essentially inelastic connector of high tensile strength, nor of fixing or adjusting the connector in set positions.

New claim 29 is not anticipated by WOMACK, because WOMACK does not disclose or teach the "resistance-exerting pivot arrangement" in combination with "an essentially inelastic connector of high tensile strength" of amended claim 21 on which claim 29 depends. Moreover, "one or more hinges" defines specific types of "pivot arrangement" whereas WOMACK only describes a bicentric gear wheel pivot.

New claims 30 and 31 should be patentable over WOMACK, because WOMACK does not disclose or teach the "resistance-exerting pivot arrangement" in combination with "an essentially inelastic connector of high tensile strength" of amended claim 21 on which claim 20 depends.

As the claims now in the case clearly bring out these distinctions with ample particularity, it is believed that they are all patentable, and reconsideration and allowance are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any

overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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